AMENDMENTS TO THE CLAIMS

The following is a complete listing of revised claims with a status identifier in parenthesis.

LISTING OF CLAIMS

1. (Currently Amended) An imaging method for a multi-slice spiral CT scan, comprising:

spirally scanning an object to be examined, with reference to its absorption behavior;

collecting measured absorption data using a detector;

projecting the measured absorption data onto a virtual detector and filtering the data; and

using measured and filtered data produced by rays that penetrate at least one voxel to reconstruct an absorption value of the at least one voxel, wherein

the filtering of the data used for the reconstruction is performed in the direction of a projection of spiral segments that are imaged thereon, produced by the spiral scanning over a prescribed angular range<u>, and wherein</u>

<u>the filtering takes place along the intersection line of doubly inclined planes in the virtual detector</u>.

2. (Canceled)

3. (Currently Amended) ~~The method as claimed in claim 1,~~ <u>An imaging method for a multi-slice spiral CT scan, comprising:</u>

<u>spirally scanning an object to be examined, with reference to its absorption behavior;</u>

<u>collecting measured absorption data using a detector;</u>

<u>projecting the measured absorption data onto a virtual detector and filtering the data; and</u>

using measured and filtered data produced by rays that penetrate at least one voxel to reconstruct an absorption value of the at least one voxel, wherein

the filtering of the data used for the reconstruction is performed in the direction of a projection of spiral segments that are imaged thereon, produced by the spiral scanning over a prescribed angular range, and wherein

the prescribed angular range for a spiral segment of length L_s is $\leq \Pi + 2 * \beta_{max}$.

4. (Canceled)

5. (Currently Amended) ~~The method as claimed in claim 4, wherein~~ An imaging method for a multi-slice spiral CT scan, comprising:

spirally scanning an object to be examined, with reference to its absorption behavior;

collecting measured absorption data using a detector;

projecting the measured absorption data onto a virtual detector and filtering the data; and

using measured and filtered data produced by rays that penetrate at least one voxel to reconstruct an absorption value of the at least one voxel, wherein

the filtering of the data used for the reconstruction is performed in the direction of a projection of spiral segments that are imaged thereon, produced by the spiral scanning over a prescribed angular range,

parallel sorting of the rays for the purpose for forming the virtual detector takes place before the filtering, and

the prescribed angular range for a spiral segment of length L_s is $\leq 180°$.

6. (Previously Presented) The method as claimed in claim 1, wherein the segment planes formed at least approximately by the spiral segments have a maximum inclination such that rays for the segment plane in the detector are present inside the measuring field at the ends of the spiral segment considered.

7. (Previously Presented) The method as claimed in claim 1, wherein, for the purpose of 3D back projection a spiral segment I_I of length $L_I = [-\alpha_{max}, +\alpha_{max}]$ with $\alpha_{max} = M \cdot \pi/p$ is subdivided equidistantly into N_{tilt} overlapping partial segments I_I^k ($1 \leq k \leq N_{tilt}$) of length L_S, whose centroids differ from one another by at most L_S, p corresponding to the set pitch, such that the following holds for the subsegments I_R^k ($1 \leq k \leq N_{tilt}$) produced:

$$I_R^{\ k} = I_I^{\ k}; 1 < k < N_{tilt}$$

$$I_R^{\ 1} = I_I^1 \cup \{-\alpha^v \max, -\alpha \max\}$$

$$I_R^{\ Ntilt} = I_I^{\ Ntilt} \cup \{\alpha \max, \alpha^v \max\}$$

and the projection datum, belonging to an image voxel, in the detector image D_k is determined by projection in the reconstruction segment I_R^k ($1 \leq k \leq N_{tilt}$), α^v_{max} representing the maximum angle reached by the ray through the voxel V.

8. (Previously Presented) The method as claimed in claim 1, wherein the measured absorption data is weighted as a function of the cosine angle of the ray produced in the direction of the axis of rotation of the detector and radiation source.

9. (Currently Amended) [[A]] The method as claimed in claim 1, wherein the detector is of planar design and includes a multiplicity of detector elements arranged matricially in rows and columns for detecting the spiral scanning.

10. (Currently Amended) A CT unit for scanning an object to be examined, comprising:

a ray bundle emanating from at least one focus;

a detector array of planar design, including a multiplicity of distributed detector elements for detecting the rays of the ray bundle, the at least one focus being adapted to move relative to the object on at least one focal track running around the object, wherein the detector array is situated opposite thereto; and

means for collecting the detector data, ~~and then~~ filtering and back-projecting the data, wherein

the measured and filtered data produced by rays that penetrate at least one voxel are used to reconstruct an absorption value of the at least one voxel, the filtering of the data ~~used for the reconstruction~~ being performed in the direction of a projection of spiral segments that are imaged thereon, produced by the spiral scanning over a prescribed angular range,

the means for filtering is implemented at least partially by at least one program or program module, and

the filtering takes place along the intersection line of doubly inclined planes in the virtual detector.

11. (Canceled)

12. (Currently Amended) [[An]] The ~~imaging~~ method as claimed in claim 1, wherein the scanning of the object is done by rotating ray bundle moving in the direction of the axis of rotation.

13. (Currently Amended) ~~An imaging~~ The method as claimed in claim 12, wherein the projecting of the measured absorption data onto a virtual detector is done at a fulcrum of the rotation.

14. (Currently Amended) ~~An imaging~~ The method as claimed in claim 1, wherein the collecting of the measured data is done by a detector of a planar design.

15. (Currently Amended) ~~An imaging~~ The method as claimed in claim 13, wherein the collecting of the measured data is done by a detector of a planar design.

16. (Canceled)

17. (Currently Amended) The method as claimed in ~~according to~~ claim 16, wherein the prescribed angular range for a spiral segment of length L_s is $\leq \Pi + 2 * \beta_{max}$.

18. (Currently Amended) The method as claimed in ~~according to~~ claim 2, wherein the prescribed angular range for a spiral segment of length L_s is $\leq \Pi + 2 * \beta_{max}$.

19. (Currently Amended) The method as claimed in claim [[2]]1, wherein parallel sorting of the rays for the purpose for forming the virtual detector takes place before the filtering.

20. (Original) The method as claimed in claim 19, wherein the prescribed angular range for a spiral segment of length L_s is $\leq 180°$.

21. (Original) The method as claimed in claim 13, wherein parallel sorting of the rays for the purpose for forming the virtual detector takes place before the filtering.

22. (Original) The method as claimed in claim 21, wherein the prescribed angular range for a spiral segment of length L_s is $\leq 180°$.

23. (Original) The method as claimed in claim 13, wherein the segment planes formed at least approximately by the spiral segments have a maximum inclination such that rays for the segment plane in the detector are present inside the measuring field at the ends of the spiral segment considered.

24. (Original) The method as claimed in claim 13, wherein, for the purpose of 3D back projection a spiral segment I_I of length $L_I = [-\alpha_{max}, +\alpha_{max}]$ with $\alpha_{max} = M \cdot \pi/p$ is subdivided equidistantly into N_{tilt} overlapping partial segments I_I^k ($1 \leq k \leq N_{tilt}$) of length L_S, whose centroids differ from one another by at most L_S, p corresponding to the set pitch, such that the following holds for the subsegments I_R^k ($1 \leq k \leq N_{tilt}$) produced:

$$I_R^{\,k} = I_I^{\,k}; 1 < k < N_{tilt}$$

$$I_R^{\,1} = I_I^1 \cup \left\{-\alpha^v \max, -\alpha \max\right\}$$

$$I_R^{\,Ntilt} = I_I^{\,Ntilt} \cup \left\{\alpha \max, \alpha^v \max\right\}$$

and the projection datum, belonging to an image voxel, in the detector image D_k is determined by projection in the reconstruction segment I_R^k ($1 \leq k \leq N_{tilt}$), α^v_{max} representing the maximum angle reached by the ray through the voxel V.

25. (Original) The method as claimed in claim 1, wherein the measured absorption data is weighted as a function of the cosine angle of the ray produced in the direction of the axis of rotation of the detector and radiation source, the cosine angle being a cosine of its cone angle.

26. (Original) The method as claimed in claim 13, wherein the measured absorption data is weighted as a function of the cosine angle of the ray produced in the direction of the axis of rotation of the detector and radiation source.

27. (Original) The method as claimed in claim 13, wherein the measured absorption data is weighted as a function of the cosine angle of the ray produced in the direction of the axis of rotation of the detector and radiation source, the cosine angle being a cosine of its cone angle.

28. (Currently Amended) [[A]] The method as claimed in claim 13, wherein the detector is of planar design and includes a multiplicity of detector elements arranged matricially in rows and columns for detecting the spiral scanning.

29. (New) The method as claimed in claim 1, wherein the prescribed angular range for a spiral segment of length L_s is $\leq \Pi + 2 * \beta_{max}$.

30. (New) The method as claimed in claim 3, wherein the segment planes formed at least approximately by the spiral segments have a maximum inclination such that rays for the segment plane in the detector are present inside the measuring field at the ends of the spiral segment considered.

31. (New) The method as claimed in claim 3, wherein, for the purpose of 3D back projection a spiral segment I_I of length $L_I = [-\alpha_{max}, +\alpha_{max}]$ with $\alpha_{max} = M \cdot \pi/p$ is subdivided equidistantly into N_{tilt} overlapping partial segments I_I^k $(1 \leq k \leq N_{tilt})$ of length L_S, whose centroids differ from one another by at most L_S, p corresponding to the set pitch, such that the following holds for the subsegments I_R^k $(1 \leq k \leq N_{tilt})$ produced:

$$I_R{}^k = I_I{}^k ;1 < k < N_{tilt}$$

$$I_R{}^1 = I_I^1 \cup \{-\alpha' \max, -\alpha \max\}$$

$$I_R{}^{Ntilt} = I_I{}^{Ntilt} \cup \{\alpha \max, \alpha' \max\}$$

and the projection datum, belonging to an image voxel, in the detector image D_K is determined by projection in the reconstruction segment

I_R^k ($1 \leq k \leq N_{tilt}$), α^v_{max} representing the maximum angle reached by the ray through the voxel V.

32. (New) The method as claimed in claim 3, wherein the measured absorption data is weighted as a function of the cosine angle of the ray produced in the direction of the axis of rotation of the detector and radiation source.

33. (New) The method as claimed in claim 3, wherein the detector is of planar design and includes a multiplicity of detector elements arranged matricially in rows and columns for detecting the spiral scanning.

34. (New) The method as claimed in claim 3, wherein the scanning of the object is done by rotating ray bundle moving in the direction of the axis of rotation.

35. (New) The method as claimed in claim 3, wherein the projecting of the measured absorption data onto a virtual detector is done at a fulcrum of the rotation.

36. (New) The method as claimed in claim 3, wherein the filtering takes place along the intersection line of doubly inclined planes in the virtual detector.

37. (New) The method as claimed in claim 4, wherein the segment planes formed at least approximately by the spiral segments have a maximum inclination such that rays for the segment plane in the detector are present inside the measuring field at the ends of the spiral segment considered.

38. (New) The method as claimed in claim 4, wherein, for the purpose of 3D back projection a spiral segment I_I of length $L_I = [-\alpha_{max}, + \alpha_{max}]$ with

$\alpha_{max} = M \cdot \pi/p$ is subdivided equidistantly into N_{tilt} overlapping partial segments I_I^k ($1 \leq k \leq N_{tilt}$) of length L_S, whose centroids differ from one another by at most L_S, p corresponding to the set pitch, such that the following holds for the subsegments I_R^k ($1 \leq k \leq N_{tilt}$) produced:

$$I_R^{\ k} = I_I^{\ k}; 1 < k < N_{tilt}$$

$$I_R^{\ 1} = I_I^1 \cup \{-\alpha^v \max, -\alpha \max\}$$

$$I_R^{\ Ntilt} = I_I^{\ Ntilt} \cup \{\alpha \max, \alpha^v \max\}$$

and the projection datum, belonging to an image voxel, in the detector image D_k is determined by projection in the reconstruction segment I_R^k ($1 \leq k \leq N_{tilt}$), $\alpha^v{}_{max}$ representing the maximum angle reached by the ray through the voxel V.

39. (New) The method as claimed in claim 4, wherein the measured absorption data is weighted as a function of the cosine angle of the ray produced in the direction of the axis of rotation of the detector and radiation source.

40. (New) The method as claimed in claim 4, wherein the detector is of planar design and includes a multiplicity of detector elements arranged matricially in rows and columns for detecting the spiral scanning.

41. (New) The method as claimed in claim 4, wherein the scanning of the object is done by rotating ray bundle moving in the direction of the axis of rotation.

42. (New) The method as claimed in claim 4, wherein the projecting of the measured absorption data onto a virtual detector is done at a fulcrum of the rotation.

43. (New) The method as claimed in claim 4, wherein the filtering takes place along the intersection line of doubly inclined planes in the virtual detector.

44. (New) An imaging method for a multi-slice spiral CT scan, comprising:

spirally scanning an object to be examined, with reference to its absorption behavior;

collecting measured absorption data using a detector;

projecting the measured absorption data onto a virtual detector and filtering the data; and

using measured and filtered data produced by rays that penetrate at least one voxel to reconstruct an absorption value of the at least one voxel, wherein

the filtering of the data used for the reconstruction is performed in the direction of a projection of spiral segments that are imaged thereon, produced by the spiral scanning over a prescribed angular range, and

for the purpose of 3D back projection a spiral segment I_I of length $L_I = [-\alpha_{max}, + \alpha_{max}]$ with $\alpha_{max} = M \cdot \pi/p$ is subdivided equidistantly into N_{tilt} overlapping partial segments I_I^k ($1 \leq k \leq N_{tilt}$) of length L_S, whose centroids differ from one another by at most L_S, p corresponding to the set pitch, such that the following holds for the subsegments I_R^k ($1 \leq k \leq N_{tilt}$) produced:

$$I_R^{\,k} = I_I^{\,k}; 1 < k < N_{tilt}$$

$$I_R^{\,1} = I_I^1 \cup \{-\alpha^v \max, -\alpha \max\}$$

$$I_R^{\,Ntilt} = I_I^{\,Ntilt} \cup \{\alpha \max, \alpha^v \max\}$$

and the projection datum, belonging to an image voxel, in the detector image D_k is determined by projection in the reconstruction segment I_R^k ($1 \leq k \leq N_{tilt}$), α^v_{max} representing the maximum angle reached by the ray through the voxel V.

45. (New) The method as claimed in claim 44, wherein the measured absorption data is weighted as a function of the cosine angle of the ray

produced in the direction of the axis of rotation of the detector and radiation source.

46. (New) The method as claimed in claim 44, wherein the detector is of planar design and includes a multiplicity of detector elements arranged matricially in rows and columns for detecting the spiral scanning.

47. (New) The method as claimed in claim 44, wherein the scanning of the object is done by rotating ray bundle moving in the direction of the axis of rotation.

48. (New) The method as claimed in claim 44, wherein the projecting of the measured absorption data onto a virtual detector is done at a fulcrum of the rotation.

49. (New) The method as claimed in claim 44, wherein the collecting of the measured data is done by a detector of a planar design.

50. (New) The method as claimed in claim 44, wherein the filtering takes place along the intersection line of doubly inclined planes in the virtual detector.

51. (New) A CT unit for scanning an object to be examined, comprising:
at least one program or program module, which when carried out in the CT unit implements the method of claim 3.

52. (New) A CT unit for scanning an object to be examined, comprising:
at least one program or program module, which when carried out in the CT unit implements the method of claim 5.

53. (New) A CT unit for scanning an object to be examined, comprising:

at least one program or program module, which when carried out in the CT unit implements the method of claim 44.